

region had not recovered from the influence of the recent passage of area No. XVIII, consequently the small changes noted. During the day the depression moved very slowly eastward, with slightly increasing energy, and by the following morning was central in the Upper Mississippi Valley. Owing to the rapid advance of a high pressure area from the region north of Lake Superior, the depression on the two succeeding days was prevented from moving in the usual course to the eastward, and consequently a curved condition of the track is indicated upon the chart. In more concise terms, the depression remained about stationary during most of the 26th and 27th. On the 28th depression central south of Lake Michigan, inclosed by the isobar of 29.80. Chicago, 29.70, a fall of 0.30 inch, N., cloudy; Milwaukee, 29.91, a fall of 0.06 inch, NE., light rain; northeast to northwest winds with rain and snow prevailed throughout the Upper Lake Region and Upper Mississippi Valley, and southerly winds with cloudy weather in the Ohio Valley and Lower Lake Region. 29th, depression central in the Province of Quebec. Cornwall, 29.32, a fall of 0.64 inch, W., clear; Montreal, 29.33, a fall of 0.55 inch, SE., cloudy; Rockliffe, 29.26, a fall of 0.75 inch, E., threatening; Quebec, 29.40, a fall of 0.81 inch, E., sleeting. The area of precipitation extended eastward to Nova Scotia with southeasterly winds. During the day the depression passed eastward over the Canadian Maritime Provinces and on the following morning was probably central off the Nova Scotia coast. The continuation of this area will appear upon chart No. V for March, 1880. No. XX.—This depression appeared on the 28th over the ocean, west of British Columbia, and by the morning of the 29th, had entered that territory, the isobar of 29.80 replacing that of 30.40 of the previous day. Rain and snow with southerly winds prevailed in Oregon and Washington Territory, and with easterly winds in the Northern Plateau Region; Olympia, 29.74, a fall of 0.50 inch, S., light snow; Portland, Or., 29.98, a fall of 0.40 inch, SE., cloudy. The continuation of this area will appear upon chart No. V for March, 1880. Of those areas charted as coming directly from the ocean, the following descriptions are given: No. IV.—This depression appeared on the 1st over northern Scandinavia as a continuation of area No. XXII, of chart No. V. for January, 1880. 1st, Tromsø, 28.84, a fall of 0.17 inch, SW., 29 miles per hour, rain and snow; Haparanda, 29.30, a fall of 0.25 inch, SW., force 6, cloudy; Archangel, 29.17, a fall of 0.31 inch, WSW., 22 miles per hour, cloudy. During the day the depression passed rapidly southeastward over the White Sea, and on the 2d was central in western Siberia; Ekaterinburg, 29.16, a fall of 0.38 inch, WSW., 27 miles per hour, cloudy; Kasan, 29.58, a fall of 0.22 inch, WSW., cloudy. 3d, depression central in the valley of the Obi; Ekaterinburg, 29.52, a fall of 0.36 inch, NW., cloudy; Barnaul, 29.58, a fall of 0.25 inch, SW., 45 miles per hour, cloudy; Yeniseisk, 29.26, a fall of 0.67 inch, E., 13 miles, snowing. During the 4th the depression disappeared in a high pressure area, 30.40 over central Siberia. No. V.—While area No. III was central west of Iceland on the 3d, this depression suddenly appeared off the northwestern coast of Norway; Tromsø, 28.68, a fall of 0.70 inch, SW., raining; Bronø, 29.26, a fall of 0.41 inch, SW., 45 miles per hour, raining; Haparanda, 29.27, a fall of 0.34 inch, SW., force 4, raining. 4th, depression central southeast of the White Sea; Archangel, 29.21, a fall of 0.28 inch, WNW., 18 miles per hour, cloudy; Kasan, 29.14, a fall of 0.59 inch, W., 13 miles, light snow; Ekaterinburg, 29.30, a fall of 0.22 inch, S., cloudy. 5th, depression central east of the Ural Mountains; Ekaterinburg, 29.28, NW., cloudy; Barnaul, 29.93, a rise of 0.02 inch, SW., fair; Yeniseisk, 29.99, a rise of 0.24 inch, wind shifted from SW. to E., clear. 6th, depression probably central between the Obi and Yenisei rivers. As area No. III appeared central in northern Russia on this date and in about the same latitude, an elongated area of barometric minima (29.40) formed in connection with the two depressions and ran eastward, north of 50° N., between the meridians of 30° and 90° E., with the lowest pressure at Ekaterinburg, 29.32, a rise of 0.04 inch, WSW., 13

miles per hour, cloudy; Barnaul, 29.48, a fall of 0.45 inch, SW., 45 miles per hour, cloudy; Yeniseisk, 29.57, a fall of 0.42 inch, S., cloudy. By morning of the 7th the depression had passed east of the Yenisei and during the day disappeared over central Siberia under the influence of a high pressure area, 30.60. No. XII.—After the passage of area No. VIII northeastward north of parallel 50° N. on the 10th, the influence of its energy still remained, and was effective in developing in the vicinity of 40° N., 35° W., another storm of great severity. The following reports from logs of vessels indicate the violent effects of an attempted restoration of atmospheric equilibrium in rear of advancing area No. VIII and which were instrumental in forming area No. XII: 10th, in 42° N., 55° W., WSW. NW. and NNW., violent gales with squalls of rain, very heavy sea; in 42° N., 57° W., W. to NW., hard gale with high confused sea; in 42° 31' N., 54° 31' W., NW., heavy storm with squalls of rain; in 48° 15' N., 49° 10' W., NNW. gale with thick snow, encountered large fields of drifting ice and icebergs between 46° 54' N. and 48° 15' W.; in 41° 30' N., 41° 30' W., heavy westerly gales, high sea. 11th, in 45° N., 46° W., NW. to NNW., violent to moderate gales, rain and snow squalls, high confused sea; in about 45° N., 35° W., terrific westerly gale with high cross sea which at times burst into the saloon, one man washed overboard, steamer made only 80 miles in over 24 hours; in 48° 24' N., 33° 13' W., NW., terrific gale, very high sea; in 47° 13' N., 34° W., SW. and WNW. hurricane, changing to gale from SW. to NW. with tremendous high sea. On the 12th the depression was probably central north of the Azores, the winds at Angra and Ponta Delgado shifted from W. to S., with falling barometer. In 47° N., 38° W., SE. to NW., fresh gale, high head sea; in 46° 33' N., 39° W., SW. to NW., violent gale, with "frightful" sea; in 49° 34' N., 28° 44' W., NW., strong gale, hard squalls, high sea; in 49° 19' N., 21° 50' W., W. to N., hard gale, very high sea; in 44° N., 23° W., hurricane from SSE., vessel thrown on beams end; in 42° 35' N., 35° 55' W., "terrible" gale from SW. to W., lasting 18 hours; in 43° 02' N., 34° 22' W., strong gale veering from SW. to NW., with high seas, 7 p. m. terrific gale from W., very high sea, smashing boats and clearing decks, four seamen lost and vessel thrown on beams end. 13th, depression central in about 50° N., 20° W. In 50° 15' N., 17° 38' W., 28.86, SSW., moderate gale, heavy rain; in 51° 26' N., 34° 50' W., 29.43, NNW., force 9, heavy northerly sea; in 46° 10' N., 43° W., ESE. to NW., heavy gale, high head sea; in 44° 39' N., 43° 48' W., E. to N. with hurricane force, ship on beams end, squalls of rain and snow with a "frightful" sea; in 48° 40' N., 34° 38' W., SE. and variable, strong gale, high confused sea; in 50° 06' N., 13° W., southwest hurricane with tremendous sea, 3 a. m., heavy sea swept decks, noon, wind shifted to WNW., and blew with great violence until midnight when it changed to WSW. with heavy squalls of rain; in 49° N., 25° W., barometer 28.10, violent gale from SW., wind suddenly changed to WNW. in a most violent squall and blew a perfect hurricane, 3 p. m., tremendous westerly sea, 5 p. m., heavy cross sea sweeping decks; in 45° N., 23° W., terrific gale from SW.; in 43° N., 28° W., hurricane from NW., lasting 48 hours; in 42° N., 30° W., "hurricane from SE. all around the compass by W., lasting 24 hours." 14th, depression moved slowly northward and during the day combined with area No. X, then central south of Iceland. In 47° 57' N., 28° W., NW., violent gale, terrific squalls, heavy sea; in 51° N., 13° 33' W., S., and W., strong gale, high sea; in 50° N., 22° 40' W., SE., SW., and NW., strong gale, very high confused sea. The continuation of this severe storm is fully considered under the head of area No. X with which, after the 14th, it became identified and together proved the most violent and extensive atmospheric disturbance of the month.

#### TEMPERATURE OF THE AIR.

The distribution of mean atmospheric temperature over the United States and Canada for the month of January, 1882, is exhibited by lines of equal thermometric mean values upon

chart No. II. The table of mean and comparative temperatures in the right-hand corner of the chart shows, in the first column, the averages for the month throughout the various districts, as deduced principally from observations taken at Signal Service stations. In the two remaining columns are shown the means for the present month, and the departures of such means from the average for many years. The temperature is everywhere above the normal, except in New England and west of the 110th meridian. The single large area of excess covers the central portion of the country, where the departures range from 1°·2 in the Middle Atlantic States to 5°·6 in the Missouri Valley. The largest area of deficiency embraces the extreme western portion of the United States, where the departures range from 1°·0 in the Southern Plateau to 4°·6 in the Middle Plateau. As a means of interesting comparison, the following maximum departures from the normal are given for each year since 1873, together with the corresponding districts: 1874, +6°·9 Ohio Valley and Tennessee, +6°·6 Middle Atlantic States and +6°·2 Lower Lake Region; 1875, -13°·1 Minnesota and -11°·6 Upper Mississippi Valley; 1876, +9°·0 Ohio Valley and Tennessee and +7°·7 Upper Mississippi Valley; 1877, -5°·4 Middle Atlantic States and -5°·8 Lower Lake Region; 1878, +13°·3 Minnesota and +12°·3 Upper Mississippi Valley; 1879, -2°·8 Middle Atlantic States and -2°·6 Lower Lake Region; 1880, +15°·5 Upper Mississippi Valley, +14°·8 Ohio Valley and Tennessee, and +13°·3 South Atlantic and West Gulf States; 1881, -9°·8 Missouri Valley and -8°·9 Southeast Rocky Mountain Slope.

*Deviations from Mean Temperatures.*—Under this heading departures exhibited by reports from the regular Signal Service stations are shown in the table of comparative temperatures on the right-hand side of chart No. II. The following items of importance, in connection with this subject, are reported by Voluntary Observers: *Connecticut*: Southington, mean temperature, 24°·3, or 1° above the mean for the past 11 years. *Illinois*: Riley, mean temperature, 20°·6, or 2°·1 above the mean for past 19 years. *Indiana*: Vevay, mean temperature considerably above the average for the month. *Kansas*: Yates Centre, mean temperature 30°·5, or 4°·4 above the average for the past 2 years. Lawrence, mean temperature 32°·68, or 5°·56 above the average for the past 14 years. Manhattan, mean temperature 31°·67, or 6°·82 above the average for past 22 years; five Januaries during this period have been warmer, viz: 1859, 1863, 1876, 1878 and 1880; the coldest January during the past 22 years occurred in 1875, mean temperature 15°·07. *Iowa*: Clinton, mean temperature considerably above the average. *Maine*: Gardiner, mean temperature 15°·75, or 2°·12 below the average for the past 46 years. *Maryland*: Fallston, mean temperature 30°·30, or 0°·31 below the average for the past 11 years; during that period, the highest January mean, 40°·13, occurred in 1880, and the lowest, 25°·05, occurred in 1881. *Michigan*: Thornville, mean temperature, 26°·0, or 4°·0 above the average for several years. *Missouri*: St. Louis, Missouri Weather Service reports, mean temperature slightly above the average for the past 45 years. *New Hampshire*: Contoocookville, mean temperature 20°·5, or about 1°·0 below the average for the past 12 years. *New York*: Palermo, mean temperature 20°·3 or 0°·8 below the average for the past 29 years; warmest January during that period, occurred in 1880, mean temperature 29°·4 and the coldest, 12°·8, occurred in 1881; the lowest temperature recorded during that period was -31° in January, 1857. North Volney, mean temperature 22°·29, or 0°·48 below the average for the past 14 years; warmest January during that period occurred in 1880, mean temperature 31°·82, coldest January occurred in 1881, mean temperature 15°·13; the lowest temperature recorded during the past 14 years was -19°, January 23d, 1871. *Ohio*: North Lewisburg, mean temperature 29°·40, or 1°·03 above the mean for the past 51 years. *Vermont*: Woodstock, mean temperature 16°·4 or about 1° above the average for the past 15 years; highest January mean during that period, 23°·8, occurred in 1880, lowest, 5°·8, occurred in 1875. *West Virginia*: Helvetia, mean

temperature 35°·6, or 2°·29 above the average for the past 6 years; Wytheville, mean temperature 36°·4, or 0°·8 above the average for the past 17 years.

Table of Maximum and Minimum Temperatures for January, 1882.

State or Territory.	Signal Service.			U. S. Army Post Surgeons or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
Alabama.....	Montgomery.....	79	24			
Arizona.....	Tucson.....	80				
Do.....	Prescott.....		8			
Arkansas.....	Little Rock.....	70	24	Mount Ida.....	65	15
California.....	Campo.....	76	1	Fort Yuma.....	80	
Do.....				Summit.....		1
Colorado.....	Denver.....	67	1			
Do.....	Pike's Peak.....	26	23			
Connecticut.....	New Haven.....	51	-12	Southington.....	53	-14
Dakota.....	Rapid City.....	56		Fort Randall.....	67	
Do.....	St. Stevenson.....		-32	Fort Pembina.....		-40
Delaware.....	Breakwater.....	56	10			
District of Columbia.....	Washington.....	59	8			
Florida.....	Key West.....	82		Ft. Brook Tampa.....	84	
Do.....	Jacksonville and.....			Fort Barrancas.....		22
Do.....	Pensacola.....		32			
Georgia.....	Savannah.....	77		Thornville.....	77	24
Do.....	Augusta.....		22			
Idaho.....	Lowiston.....	31				
Do.....	Earle Rock.....		-30			
Illinois.....	Chgo.....	64		Swanwick and.....		
Do.....	Chicago.....		1	Upper Alton.....	67	
Do.....				Elmira and Mor-		
Do.....				rison.....		-7
Indiana.....	Indianapolis.....	61	7	Vevay.....	65	
Do.....				Lafayette.....		1
Indian Territory.....	Fort Gibson.....	74				
Do.....	Fort Supply.....		-6			
Iowa.....	Keokuk.....	60		Cresco.....		-17
Do.....	Dubuque.....		-5			
Kansas.....	Dodge City.....	67	0	Ft. Scott.....	70	
Do.....				Ft. Wallace.....		-15
Kentucky.....	Louisville.....	65	10	Bowling Green.....	65	18
Louisiana.....	New Orleans.....	77				
Do.....	Shreveport.....		30			
Maine.....	Eastport.....	43	-14	Gardiner.....		-27
Do.....	Portland.....					
Maryland.....	Baltimore.....	59	7	Federalburg.....	61	
Do.....				Deer Park.....		-8
Massachusetts.....	Boston.....	53	-13	Heath.....	60	
Do.....				South Lee.....		-24
Michigan.....	Detroit.....	56		Fort Brady.....		-34
Do.....	Alpena.....		-27			
Minnesota.....	Duluth.....	47				
Do.....	St. Vincent.....		-42			
Mississippi.....	Vicksburg.....	74	30	Fayette.....	75	28
Missouri.....	Saint Louis and.....			Protem.....	72	
Do.....	Springfield.....	60	6	Oregon.....		-4
Montana.....	Fort Custer.....	52		Ft. Keogh.....	60	-37
Do.....	Terry's Landing.....		-36			
Nebraska.....	North Platte.....	55	-8			
Nevada.....	Pioche.....	38		Golconda.....	74	
Do.....	Winnemucca.....		-4	Holbeck.....		-34
New Hampshire.....	Mt. Washington.....	34	-39	Contoocookville.....	46	
Do.....				Grafton.....		-22
New Jersey.....	Atlantic City.....	59		Vineland.....	62	
Do.....	Barnegat.....		-1	South Orange.....		-4
New Mexico.....	La Mesilla.....	72		Ft. Union.....		-11
Do.....	Santa Fe.....		7			
New York.....	Rochester.....	53		Ft. Niagara.....	56	
Do.....	Albany.....		-14	Copertown and.....		
Do.....				Johstown.....		-27
North Carolina.....	Wilmington.....	73		Weldon.....		5
Do.....	Charlotte.....		16			
Ohio.....	Cincinnati.....	63		Portsmouth.....	67	
Do.....	Cleveland.....		2	Hudson.....		0
Oregon.....	Portland.....	53				
Do.....	Umatilla.....		4			
Pennsylvania.....	Pittsburg.....	61		Milton.....	57	
Do.....	Erie.....		-3	Bloomington.....		-19
Rhode Island.....	Newport.....	50	-8			
South Carolina.....	Charleston.....	76	26	Aiken.....		21
Tennessee.....	Memphis.....	71		Ashwood.....		16
Do.....	Knoxville.....		18			
Texas.....	Edinburg.....	84		Ft. Ringgold.....	86	
Do.....	Fort Elliott.....		4			
Utah.....	Salt Lake City.....	47	0	Coalville.....		-25
Vermont.....	Burlington.....	49	-25	Woodstock.....	50	
Do.....				Lunenburg.....		-29
Virginia.....	Norfolk.....	66				
Do.....	Chincoteague.....		8			
Washington Ter.....	Albino.....	55				
Do.....	Colfax.....		-8			
West Virginia.....	Morgantown.....	64	9	Flemington.....		8
Wisconsin.....	Milwaukee.....	52		Embarrass and.....		
Do.....	La Crosse.....		-11	Neillsville.....		-20
Wyoming.....	Cheyenne.....	60	-12	Fort Bridger.....		-23

*Ranges of Temperature at Signal Service Stations.*—Monthly ranges in general varied from 40° to 60° over the country east of the Rocky Mountains, and from 45° to 70° westward to the Pacific. The *smallest* ranges are: San Francisco, 21°; Key West, 25°; Portland, Or., 29°; San Diego, 30°; Port Eads, 31°; Red Bluff and New Orleans, 33°; Olympia, 35°; Hatteras, 36°;

Galveston and Punta Rassa, 38°. The *largest* are: New Chicago, Mont., 90°; Terry's Landing, Mont., 88°; Fort Benton, 87°; Smithville, Dak., Fort Shaw, Mont., and Prescott, Ariz., 79°; Fort Custer, 77°; Camp Supply, Ind. Ty., 76°; Burlington, Vt., Fort Assinnaboine, Mont., and St. Vincent, 74°; Mt. Washington and Fort Missonla, 73°; Rapid City, Dak., Fort Buford and Cheyenne, 72°; Duluth, 71°; Fort Elliot, Tex., 70°. The *daily* ranges varied in the different districts as follows: New England, 26° at New Shoreham to 37° at Eastport and 47° on the summit of Mt. Washington; Middle Atlantic States, 21° at Lynchburg to 34° at Albany and Barnegat and 37° at Chincoteague; South Atlantic States, 23° at Charleston to 29° at Atlanta and 32° at Portsmouth; Florida Peninsula, 13° at Key West to 19° at Cedar Keys and 21° at Punta Rassa; Eastern Gulf States, 23° at Mobile, 24° at New Orleans and 28° at Montgomery; Western Gulf States, 28° at Port Eads to 30° at Indianola and 41° at Denison and Fort Gibson; Rio Grande Valley, 26° at Brownsville to 32° at Eagle Pass and 35° at Castroville; Ohio Valley and Tennessee, 21° at Columbus to 29° at

Pittsburg and 34° at Indianapolis; Lower Lake Region, 24° at Detroit and Toledo to 29° at Buffalo and 34° at Oswego; Upper Lake Region, 23° at Grand Haven to 37° at Duluth and 41° at Alpena; Extreme Northwest, 41° at St. Vincent to 44° at Fort Buford and 53° at Bismarck; Upper Mississippi Valley, 30° at Keokuk to 39° at St. Paul and 42° at St. Louis; Missouri Valley, 27° at Leavenworth to 44° at Yankton and 50° at Huron; Northern Slope, 36° at Cheyenne to 40° at Deadwood and 50° at Fort Custer; Middle Slope, 41° at Dodge City to 44° at Denver and 48° at Fort Elliott; Southern Slope, 34° at Fort Davis to 40° at Henrietta and 45° at Concho; Northern Plateau, 23° at Umatilla to 32° at Missoula and 35° at Eagle Rock; Middle Plateau, 21° at Salt Lake City to 28° at Pioche and 40° at Winnemucca; Southern Plateau, 34° at Santa Fé to 46° at La Mesilla and 48° at Prescott; Northern Pacific Coast, 16° at Roseburg to 17° at Portland and 21° at Olympia; Middle Pacific Coast, 11° at San Francisco to 21° at Sacramento and 31° at Red Bluff; South Pacific Coast, 28° at Los Angeles to 32° at Visalia and 48° at Campo.

Table of Comparative Minimum Temperatures for the Month of January, 1882.

State or Territory.	Minimum for January, 1882, Signal Service.		Lowest since Signal Service stations were opened—3 to 11 years.			Lowest from any other source.			
	Station.	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
Alabama	Montgomery	-3	Montgomery	0	1879	Huntsville	-9	1832 & 36	9 years.
Arizona	Prescott	-8	Prescott	-17	1880	Fort Canby	-20	1865	12 "
Arkansas	Little Rock	-24	Little Rock	18	1881	Mount Ida	-10	1878	6 "
California	Campo	7	Campo	0	1880	Fort Crook	-20	1839	11 "
Do						Fort Bidwell	-18	1868	19 "
Colorado	Pike's Peak	-33	Pike's Peak	-53	1879	Fort Garland	-40	1873	20 "
Do	Denver	1				Fort Lyon	-28	1875	21 "
Connecticut	New Haven	-12	New Haven	-5	1881	Colebrook	-25	1861	9 "
Dakota	Fort Stevenson	-32	Perkins	-53	1877	Fort Randall	-44	1875	23 "
Delaware	Delaware Breakwater	10	Delaware Breakwater	12	1881	Fort Delaware	-5	1866	44 "
Do						Dover	0	1875	6 "
Dist. of Columbia	Washington	8	Washington	-14	1881	Washington	-14	1835	48 "
Florida	Jacksonville and Pensacola	32	St. Marks	18	1879	Fort Barrancas	10	1832	60 "
Georgia	Augusta	12	Atlanta	9	1879	Atlanta	3	1873	8 "
Do						Augusta Arsenal	8	1835	48 "
Idaho	Eagle Rock	-30	Eagle Rock	-25	1881	Fort Lapwai	-32	1875	18 "
Illinois	Chicago	1	Champaign	-15	1881	Rock Island Arsenal	-29	1873	14 "
Do						Galesburg	-29	1864	8 "
Indiana	Indianapolis	-6	Indianapolis	-22	1879	Arlington	-25	1879	2 "
Indian Territory	Fort Supply	-7	Fort Supply	-17	1881	Fort Gibson	-20	1837	54 "
Iowa	Duquene	-5	Duquene	-25	1881	Fort Madison	-33	1864	22 "
Kansas	Dodge City	0	Leavenworth	-20	1875	Fort Leavenworth	-30	1864	51 "
Kentucky	Louisville	16	Louisville	-30	75 & '79	Newport Barracks	-15	1832	28 "
Louisiana	Shreveport	30	Shreveport	6	1879	Baton Rouge	8	1832	52 "
Maine	Eastport	-14	Eastport	-15	1878	Brunswick	-32	1869	52 "
Do						Gardiner	-31	1844	46 "
Maryland	Baltimore	7	Baltimore	-6	1881	Fort Mifflin	-15	1873	52 "
Massachusetts	Boston	-13	Springfield	-14	1881	Williamstown	-30	1835	55 "
Do						Lunenburg	-29	1835	24 "
Michigan	Alpena	-27	Escanaba and Marquette	-26	1881	Fort Brady	-42	1873	60 "
Minnesota	St. Vincent	-42	St. Vincent	-44	1881	Ontonagon	-34	1861	11 "
Mississippi	Vicksburg	30	Vicksburg	10	1875	Fort Ripley	-44	1860	17 "
Missouri	Springfield and St. Louis	6	St. Louis	-16	1875	Fayette	7	1879	8 "
Montana	Terry's Landing	-26	Fort Benton	-75	1875	Ashly	-27	1879	4 "
Do						Fort Benton	-58	1875	12 "
Nebraska	North Platte	-8	North Platte	-27	1881	Fort Ellis	-33	1872	14 "
Nevada	Winnemucca	-4	Winnemucca	-14	1879	Camp Sheridan	-29	1879	4 "
Do						Fort Riley	-3	1864	5 "
New Hampshire	Mount Washington	-29	Mount Washington	-36	1875	Fort Hook	-22	1868	12 "
Do						Barnmouth College	-34	1848	18 "
New Jersey	Barnegat	-1	Barnegat	-10	1875	Stratford	-33	1861	11 "
Do						Patterson	-13	1866	6 "
New Mexico	Santa Fe	7	Santa Fe	-9	1881	Burnt Mills	-24	1875	3 "
New York	Albany	-14	Albany	-18	1878	Fort Wingate	-16	1864	20 "
Do						Salem	-40	1840	20 "
North Carolina	Charlotte	16	Charlotte	11	75 & '81	Gouverneur	-38	1835	40 "
Do						Ashville	-1	1879	4 "
Ohio	Cleveland	2	Kirtzbank	11	1879	Jack-onburg	-25	1879	8 "
Do			Columbus	-20	1879	Marietta	-22	1832	53 "
Oregon	Umatilla	4	Umatilla	-25	1879	Fort Dalles	-23	1862	16 "
Pennsylvania	Erie	-2	Erie	-15	1875	Carlisle Barracks	-28	1873	37 "
Do						Philadelphia	-9	1866	113 "
Rhode Island	Newport	-8	Newport	3	1879	Fleming	-6	1861	6 "
Do						Providence	-17	1866	36 "
South Carolina	Charleston	26	Charleston	23	1879	Fort Adams	-13	1873	41 "
Do						Fort Monroe	14	1835	38 "
Tennessee	Knoxville	18	Knoxville	-14	1877	Charleston	16	1832	105 "
Texas	Fort Elliott	4	Fort Point	-5	1879	Clarkville	-10	1879	8 "
Utah	Salt Lake City	0	Salt Lake City	2	80 & '81	Fort Davis	-15	1873	28 "
Vermont	Burlington	-25	Burlington	-17	1878	Coalville	-17	1879	7 "
Do						Woodstock	-30	1875	8 "
Virginia	Chincoteague	-8	Fort Whipple	-8	1881	Craftsburg	-25	1868	9 "
Washington	Colefax	-8	Dayton	-2	1881	Wytheville	-6	1879	9 "
West Virginia	Morgantown	9	Morgantown	-6	1875	Fort Colville	-30	1862	21 "
Wisconsin	La Crosse	-11	La Crosse	-31	1875	Helvelia	-14	1879	6 "
Do						Embarras	-40	1875	19 "
Wyoming	Cheyenne	-12	Cheyenne	-8	1875	Fort Howard	-30	1841	31 "
Do						Fort Winnebago	-29	1841	12 "
						Fort Sanders	-61	1875	13 "
						Fort Laramie	-40	1864	29 "

**Frosts.**—In the various districts they were reported on the following dates: New England, 1st to 8th, 10th to 31st; Middle Atlantic States, 1st to 8th, 10th, 11th, 12th, 14th, 15th, 17th to 26th, 28th to 31st; South Atlantic States, 1st to 5th, 22nd to 26th, 30th, 31st; Florida Peninsula, Cedar Keys, 2d, 3d, 31st; East Gulf States, 2d, 3d, 23d; West Gulf States, 2d, 11th, 17th, 18th, 19th, 22d, 23d, 29th, 30th, 31st; Rio Grande Valley, 1st, 2d, 16th, 18th, 21st, 31st; Ohio Valley and Tennessee, 1st to 7th, 9th, 10th, 12th, 14th to 25th, 28th to 31st; Lower Lake Region, 1st to 31st; Upper Lake Region, 1st to 31st; Extreme Northwest, 1st to 31st; Upper Mississippi and Missouri Valleys, 1st to 31st; Northern Slope, 1st to 31st; Middle Slope, 1st to 6th, 8th to 31st; Southern Slope, 12th, 16th to 19th, 22d, 23d, 29th, 30th, 31st; Southern Plateau, 1st, 2nd, 4th to 31st; Middle Plateau, 1st to 4th, 8th, 9th, 10th, 13th to 31st; Northern Plateau, 3d, 7th, 12th, 13th, 15th, 16th, 19th to 25th; North Pacific Coast region, 9th to 12th, 15th to 22d, 25th, 27th to 30th; South Pacific Coast region, 1st, 3rd to 23d, 25th to 31st.

**Ice.**—Regarding its formation in the northern sections, this subject is considered elsewhere in the REVIEW under the head of *Ice in Rivers and Harbors*. The following are exceptional cases of ice formation in the southern sections of the country: Augusta, Ga., 2d, 23d; Jacksonville, Fla., 2d; Sloop Point, N. C., 2d; Portsmouth, N. C., 2d, 3d, 23d; Pensacola, Fla., 2d; Indianola, 17th; Victoria, Tex., 17th; Cuero, Tex., 17th, 19th; Mason, Tex., 17th, 19th; Eagle Pass, Tex., 17th; Tucson, Ariz., 18th; Florence, Ariz., 9th, 10th, 11th; Los Angeles, Cal., 27th; San Diego, Cal., 29th; Red Bluff, Cal., 9th, 10th to 14th, 18th, 24th; Visalia, Cal., 11th, 12th, 13th; Point San José, Cal., 13th, 14th; St. Augustine, Fla., 2d, very thin.

**Low Temperatures.**—The following are notable instances of extremely cold weather in various portions of the country attending the development and progress of areas of high barometer. *California*: San Jose, 13th, weather excessively cold during the past three days. Marysville, 13th, "phenomenally cold weather" for past two days; during the night of the 12th ice formed in gutters sufficient to bear a man's weight; temperature 9° below freezing. North San Juan, 13th, coldest weather for many years past; temperature 10° to 14° below freezing. Stockton, 13th, coldest weather for many years; ice one inch thick near the town. Fresno, 13th, weather for past 48 hours coldest ever experienced; ice formed during night, and in shady places remained all day; temperature 21° above zero. San Buenaventura, 13th, weather extremely cold; lambs and sheep dying from exposure. Los Angeles, 13th, severest weather ever known in southern California; "hills all around the city, down almost to the plains, white with snow." Merced, 13th, coldest weather for several years; ice formed more than one half inch in thickness. Alta, 13th, minimum temperature 22° below freezing; reservoirs frozen sufficient to permit skating; all mining ditches frozen rendering them temporarily useless. Yreka, 13th, minimum temperature 25° below freezing; coldest weather for several years. Campo, 12th, minimum temperature 6° 5, lowest for several years. San Geronimo, month remarkable for continued low temperatures; minimum temperature 19° on the 12th, lowest for many years. *Canada*: Parry Sound, 24th, —38°. Saugeen, 24th, —16°. Port Stanley, 24th, —10°. Toronto, 24th, —18°. Kingston, 24th, —19°. Montreal, 24th, —26°. Anticosti, 24th, —16°. Quebec, 24th, —26°. *Connecticut*: Hartford, 24th, 10° to 18° below zero, and in the surrounding towns as low as —20°. Southington, 25th, minimum temperature —14°, coldest day in past 25 years. *Massachusetts*: Boston, 24th, reports from different parts of New England show the thermometer to have fallen from 10° to 37° below zero. Worcester, 24th, coldest weather for past 12 years; in various parts of the city, thermometer from 12° to 20° below zero; in some portions of the country, the temperature fell to —26°. *Missouri*: St. Joseph, 16th, coldest day of the season; temperature 5° above zero. Carrollton, 16th, lowest temperature yet recorded for the season. Joplin, 16th, coldest of the season. Carthage, 16th, coldest of

the season. *Montana*: Fort Missoula, 29th, minimum temperature —31°, lowest since station was opened. *New Brunswick*: St. Johns, 18th, minimum temperature —28°, weather exceedingly severe. *Nevada*: Halleck, 12th, coldest weather for several years; temperature 30° below zero. Wells, 12th, exceedingly cold weather; temperature 30° below zero. Elko, 12th, temperature 25° below zero. Carlin, 12th, temperature 27° below zero; coldest weather ever experienced here. *New Jersey*: Long Branch, 24th, temperature —8°; preparations made for cutting ice. Red Bank, 24th, North Shrewsbury river frozen over; coldest weather for several years. *New Hampshire*: Colbrook, 24th, weather almost unendurable for the past two days. Portsmouth, 24th, temperature —24°; several vessels put into lower harbor, heavily encased in ice and unable to proceed further; crews suffered intensely from extreme cold and, in some cases, were frost-bitten; fishermen report the most "intense weather" at sea that it has ever been their lot to experience. Contoocookville, 24th and 25th, minimum temperature —15°; coldest days during the past 11 years. *Rhode Island*: Providence, 24th, coldest day of the season; thermometer from 10° to 15° below zero. Newport, 24th, coldest weather for past 10 years, temperature —6°; public schools closed, as it was found impossible to heat them. *New York*: Norwich, 24th, —33°; Poughkeepsie, 24th, all points along the river and from the interior of the river counties, reported the experience of intense cold; thermometer 16° to 20° below zero. Rochester 24th, —7°. Saranac Lake, 24th, —40°. Plattsburgh, 24th, —25°. Keesville, 24th, —24°. Port Henry, 24th, —22°. Ticonderoga, 24th, —25°. Whitehall, 24th, —35°. Glen's Falls, 24th, —26°. Lake George, 24th, —25°. Saratoga, 24th, —36°. *Vermont*: Burlington, 24th, maximum temperature —4°, minimum temperature —24.8°; coldest day since 1857.

#### PRECIPITATION.

The general distribution of rain-fall over the United States and Canada for the month of January, 1882, is exhibited upon chart No. III from the reports of over 500 stations. From the table in the left-hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records of Signal Service stations, covering a period of several years, to which is subjoined a comparison of the present month with such averages. Upon comparison with the chart, the tabulated averages show four very irregular areas of excess and deficiency. The former condition prevails and the areas embrace the entire eastern portion of the country, except the South Atlantic States and the Florida Peninsula, while to the west of the Mississippi they include the Extreme Northwest, Middle and Southern Slopes, Western Gulf States, Rio Grande Valley, and the Southern and Northern Plateaux. The departures of excess range from 0.11 inch in the Lower Lake Region to 9.92 inches in Tennessee. The excess in this State, for the present month, is the largest and most remarkable since the opening of Signal Service stations. The most serious floods have resulted from this marked and sudden increase of precipitation, and the consequent damage to property has been almost without precedent. The areas of deficiency are comparatively small and widely separated, and the departures range from 0.11 inch in the Middle Plateau to 4.42 inches in the Middle Pacific Coast region. The deficiency on the Pacific coast, especially in the two northern districts, is very large and quite unusual for the month. As a means of interesting comparison, the following maximum departures from the normal are given for each year since 1873, together with the corresponding districts: 1874, large excess, Lower Lake region; 1875, +3.02 inches, South Atlantic States; 1876, +3.15 inches, Ohio Valley and Tennessee, and —2.15 inches, South Atlantic States; 1877, —1.50 inches, Pacific Coast Regions, and —0.95 inch, Western Gulf States; 1878, +3.76 inches, Middle and South Pacific Coast Regions, and +2.17 inches, New England; 1879, +3.43 inches, Tennessee, and —2.12 inches, Eastern Gulf States; 1880, +6.21 inches, Portland, Or., —3.05 inches, Eastern Gulf States, and —2.45 inches, Middle and South Pacific Coast Regions; 1881, +3.80